Specifications & Drive Belt Routing - 2.0L (AEG, AVH, AZG, BBW, BDC, BEV & BGD Engine Code)

ENGINE IDENTIFICATION

Engine identification is stamped on machined surface between engine and transmission. See **2.0L ENGINE/MODEL IDENTIFICATION** table. Additionally, there is a sticker, located on timing belt guard. Engine code is also included on vehicle data plate.

2.0L ENGINE/MODEL IDENTIFICATION

Year	Model	(1) Engine Code
2002		
	Golf & Jetta	AVH & AZG
	New Beetle	AEG, AVH/AZG
2003		
	Golf & Jetta	AVH, AZG & BBW
	New Beetle	AVH/AZG
	New Beetle Convertible	BDC
2004		
	Golf & Jetta	AVH, AZG, BBW & BEV
	New Beetle	BEV
	New Beetle Convertible	BGD

(1) See **Fig. 1** , **Fig. 2** or **Fig. 3** .

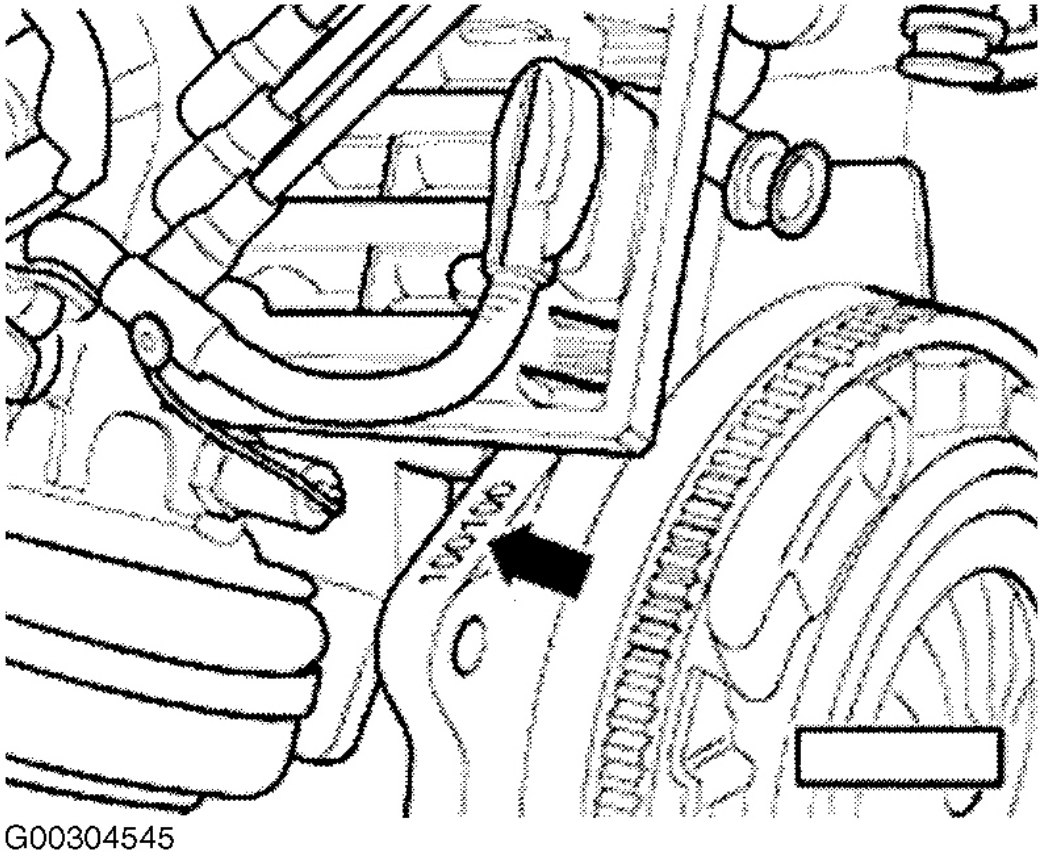


Fig. 1: Locating Engine Code (AVH, AZG, BBW & BEV - Golf & Jetta)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

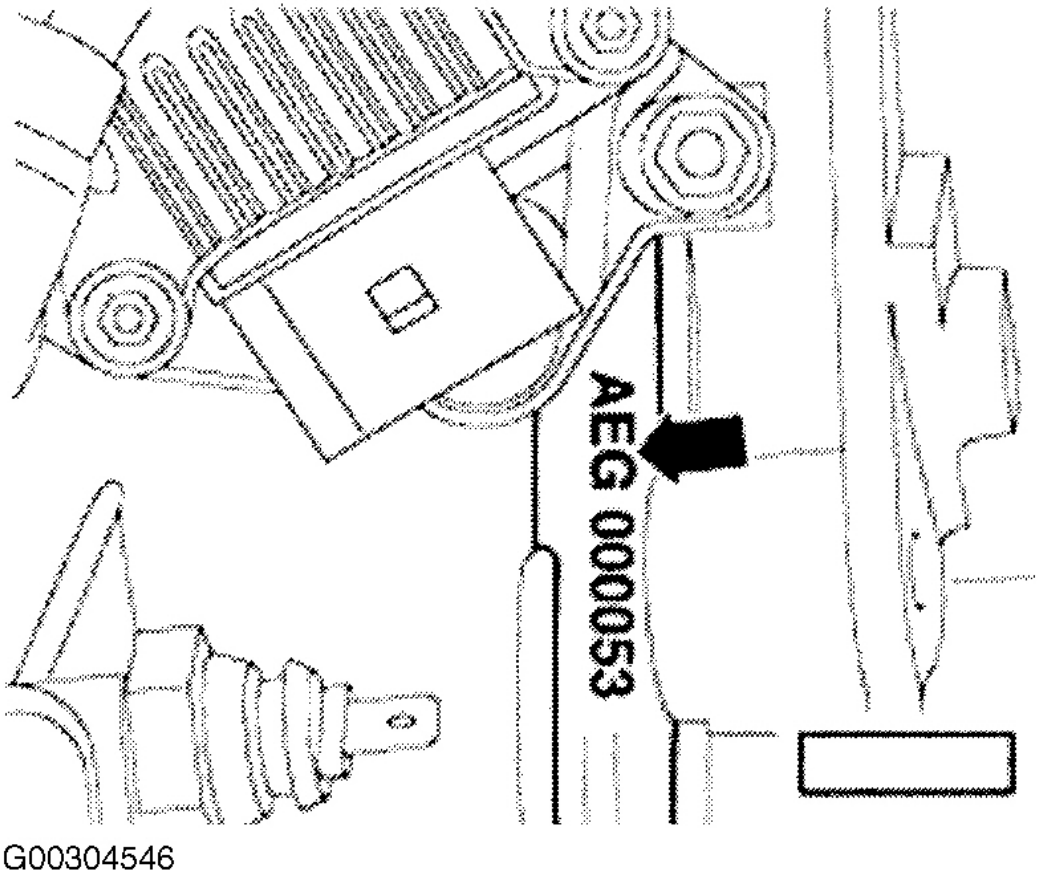


Fig. 2: Locating Engine Code (AEG - New Beetle)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

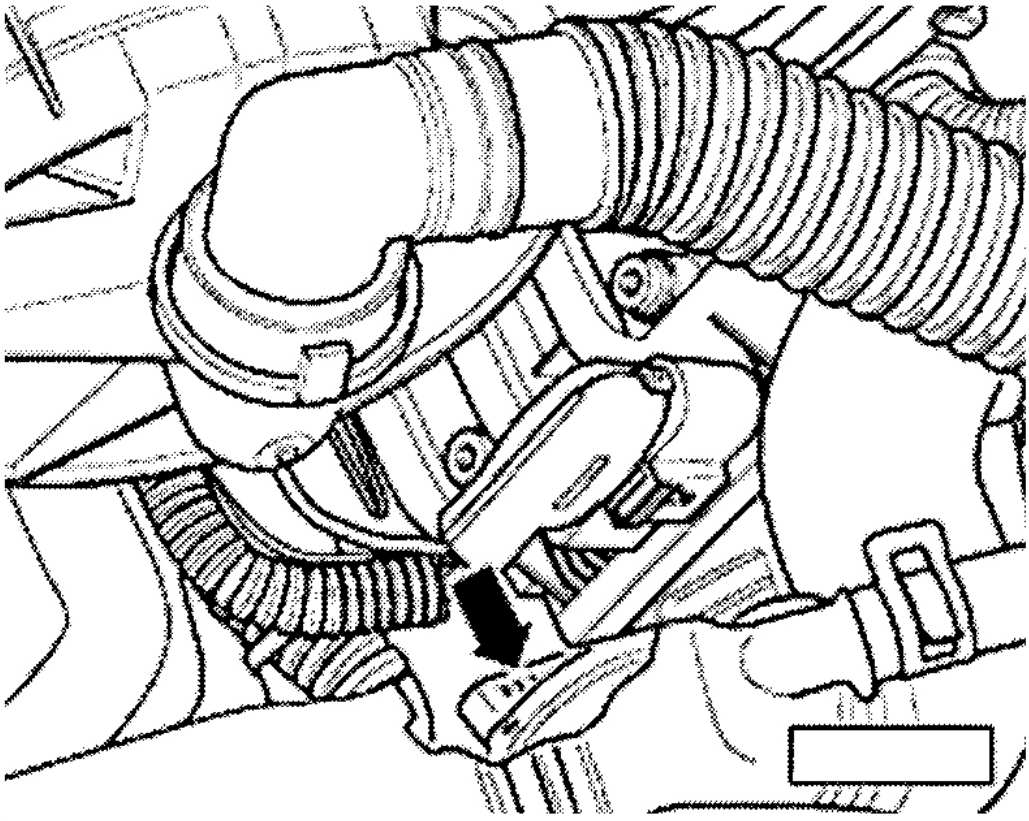
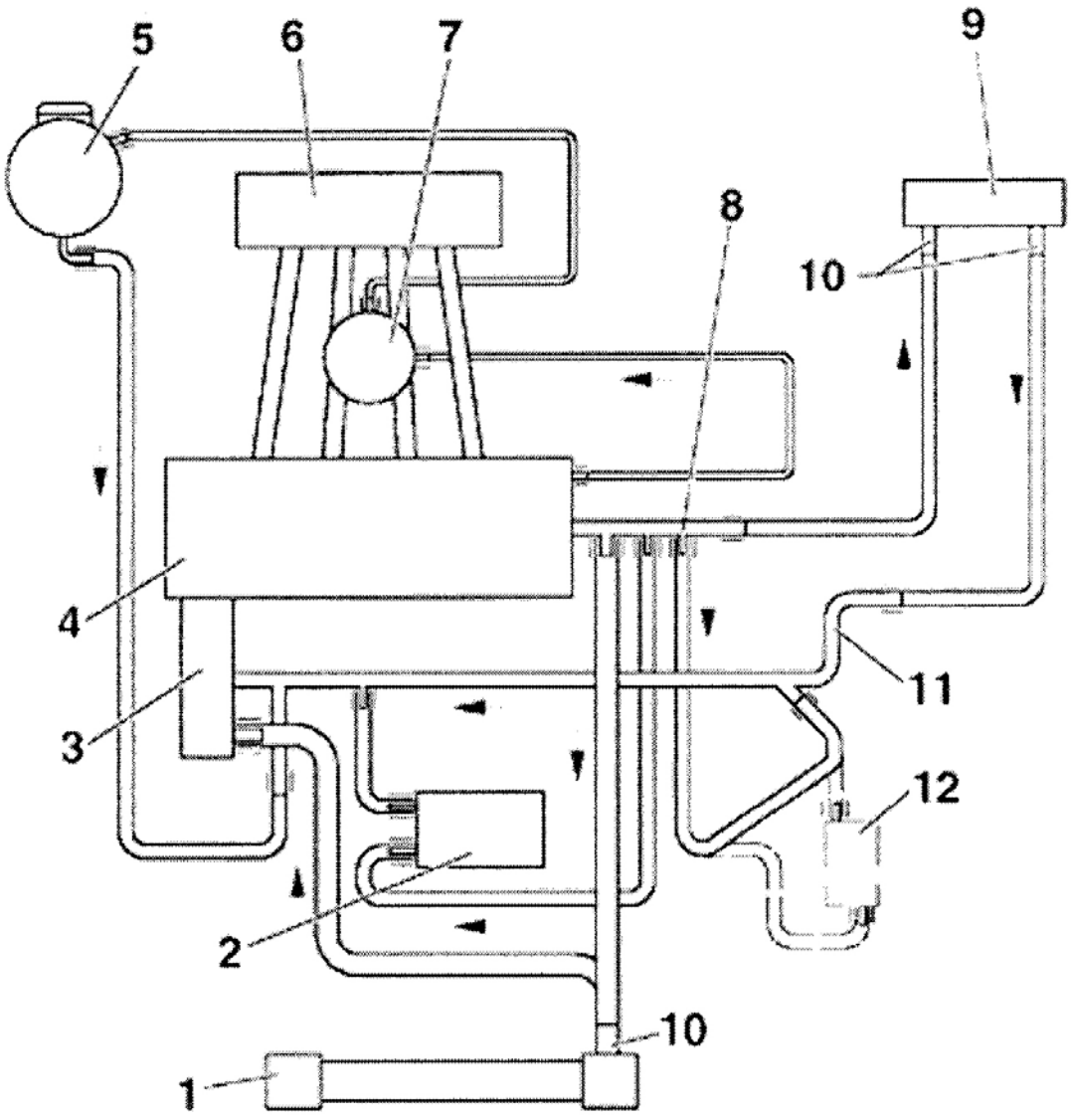


Fig. 3: Locating Engine Code (AVH, AZG, BDC, BEV & BGD - New Beetle)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

COMPONENT LOCATIONS

COOLING SYSTEM IDENTIFICATION

NOTE: **Three letter code indicates engine identification code. For location of engine code, see ENGINE IDENTIFICATION .**



1. Radiator
2. Oil Cooler
3. Water Pump/Thermostat
4. Cylinder Head/Cylinder Block
5. Expansion Tank
6. Intake Manifold
7. Throttle Valve Control Module
8. Connecting Unions
9. Heat Exchanger
10. Quick-Action Coupling
11. Coolant Pipe
12. ATF Cooler (Automatic Transmission Only)

Fig. 4: Identifying Cooling System Components & Coolant Flow (AEG, AVH, AZG, BDC, BEV & BGD - New Beetle)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

DRAINING, FILLING & BLEEDING

COOLING SYSTEM PRECAUTIONS

Golf & Jetta

CAUTION: On model year 2004 Golf and Jetta, engine code BEV uses G12 coolant that is Lilac (Purple) in color. Refer to TSB Group 19 No. 02-01, dated Dec. 20, 2002. See COOLANT (ANTIFREEZE), MIXING PRECAUTIONS .

For all except 2004 Golf and Jetta with BEV engine code, use only coolant additive G12 meeting specification VW 774 D. G12 coolant is Red in color. G12 must not be mixed with any other additives. If fluid in expansion tank is Brown, this is an indication that G12 has been mixed with another type of coolant. In this case, coolant must be changed.

G12 coolant additive may be used in older vehicles when original coolant is drained and cooling system is flushed. Contaminated coolant must be drained immediately and cooling system flushed. See **SERVICING** . Also, if radiator, heat exchanger (heater core), cylinder head or cylinder head gasket, have been replaced, flush cooling system and replace engine coolant.

New Beetle

NOTE: Cooling system precautions reference to TSB Group 19 No. 02-01, dated Dec. 20, 2002. See COOLANT (ANTIFREEZE), MIXING PRECAUTIONS .

Use only coolant additive G 12 meeting specification VW 774 F. G 12 coolant is Lilac (Purple) in color. Red coolant G12, meeting specification VW 774 D, can be mixed with G 12 Lilac coolant. G 12 must NOT be mixed with any other additives. If fluid in expansion tank is Brown, this is an indication that G 12 has been mixed with another type of coolant. In this case, coolant must be changed.

G 12 coolant additive may be used in older vehicles when original coolant is drained and cooling system is flushed. Contaminated coolant must be drained immediately and cooling system flushed. See **SERVICING** . Also, if radiator, heat exchanger (heater core), cylinder head or cylinder head gasket, have been replaced, flush cooling system and replace engine coolant.

DRAINING, FILLING & BLEEDING COOLING SYSTEM

Golf & Jetta

WARNING: Cooling system is pressurized, when engine is at operating temperature. Use caution and use other appropriate protective gear (safety glasses and gloves) when servicing cooling system. Slowly and carefully release

system pressure, before performing any repairs.

CAUTION: On model year 2004 Golf and Jetta, engine code BEV, uses G12 coolant that is Lilac (Purple) in color. Refer to TSB Group 19 No. 02-01, dated Dec. 20, 2002. See COOLANT (ANTIFREEZE), MIXING PRECAUTIONS .

1. Turn engine off, and allow to cool. Open cap on coolant expansion tank. Raise and support vehicle. Remove noise insulation panel from below engine compartment. See **Fig. 5** .

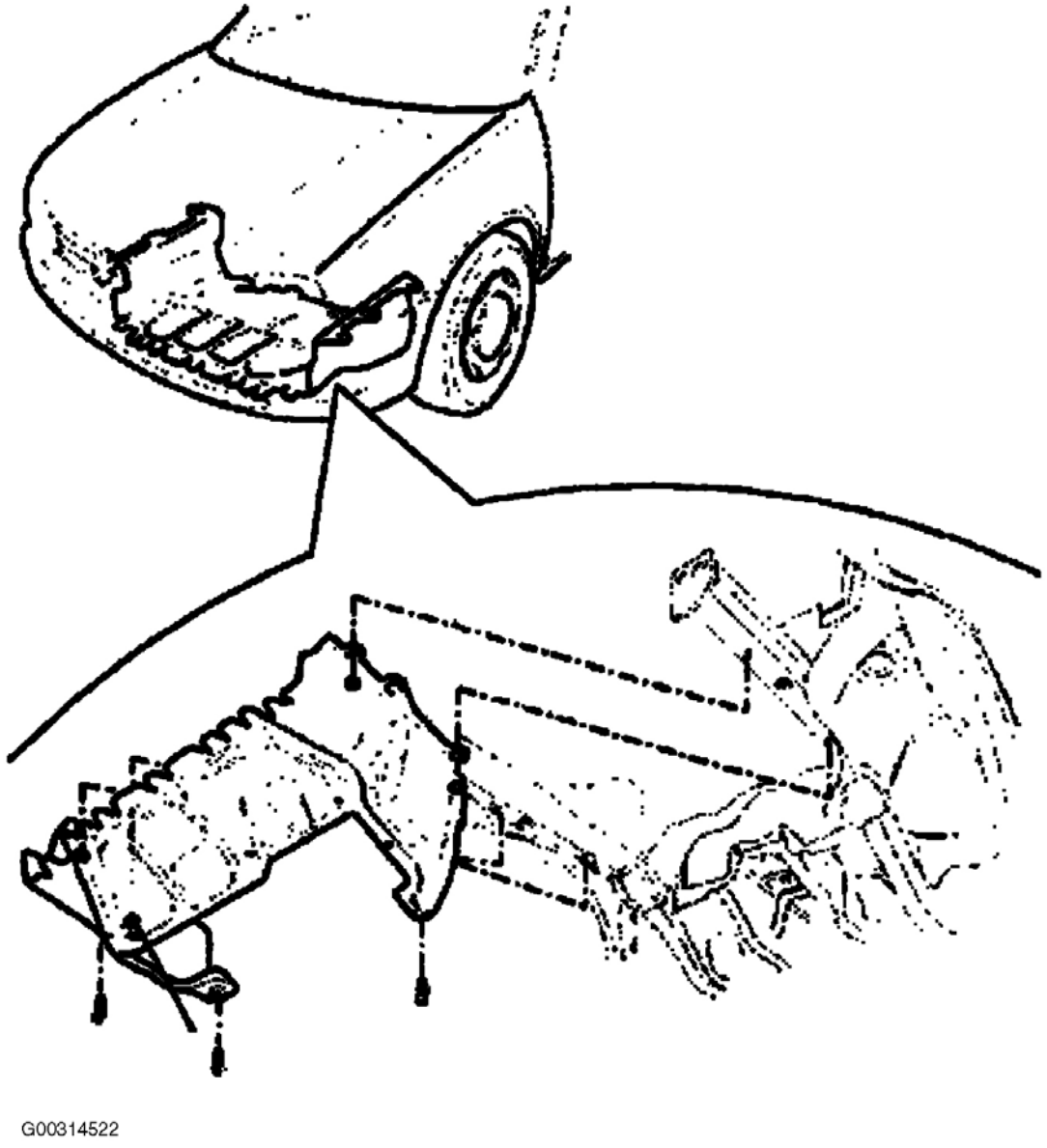


Fig. 5: Identifying Noise Insulation Mounting Points

Courtesy of VOLKSWAGEN UNITED STATES, INC.

2. Unscrew drain plug (arrow), and drain coolant from radiator. See **Fig. 6** . Remove coolant hose from oil cooler (arrow). See **Fig. 7** . Drain coolant from engine.

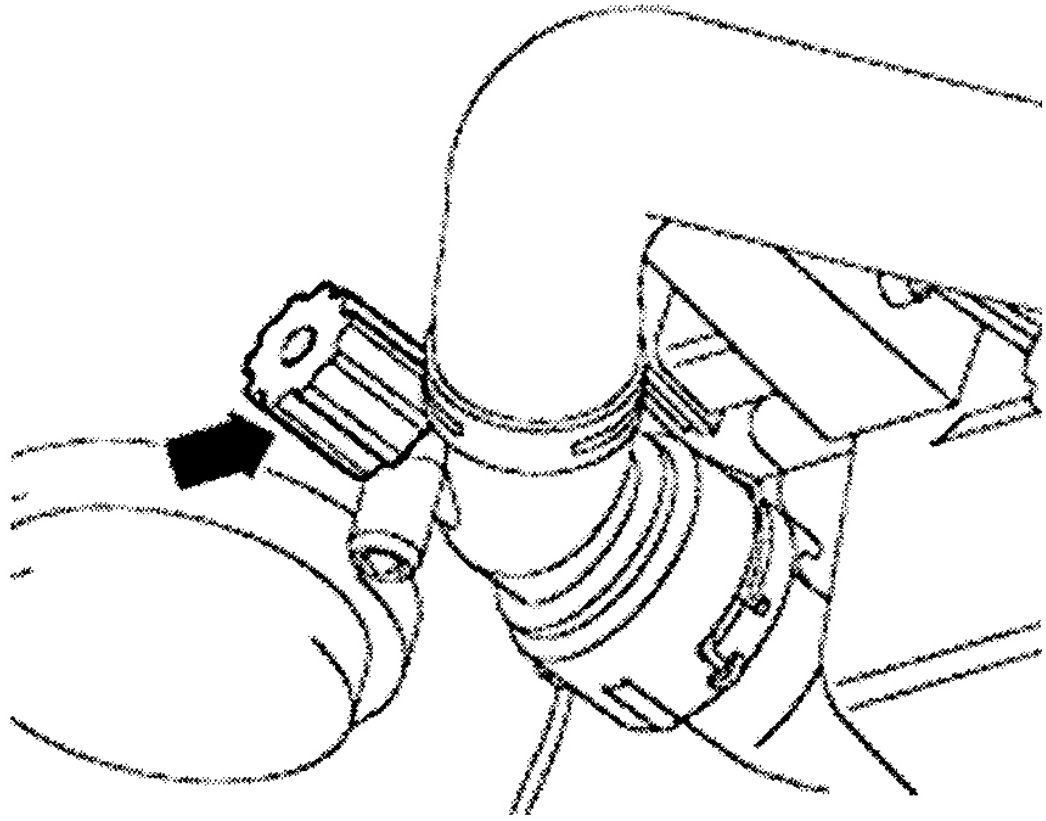


Fig. 6: Identifying Drain Screw On Radiator
Courtesy of AUDI OF AMERICA, INC.

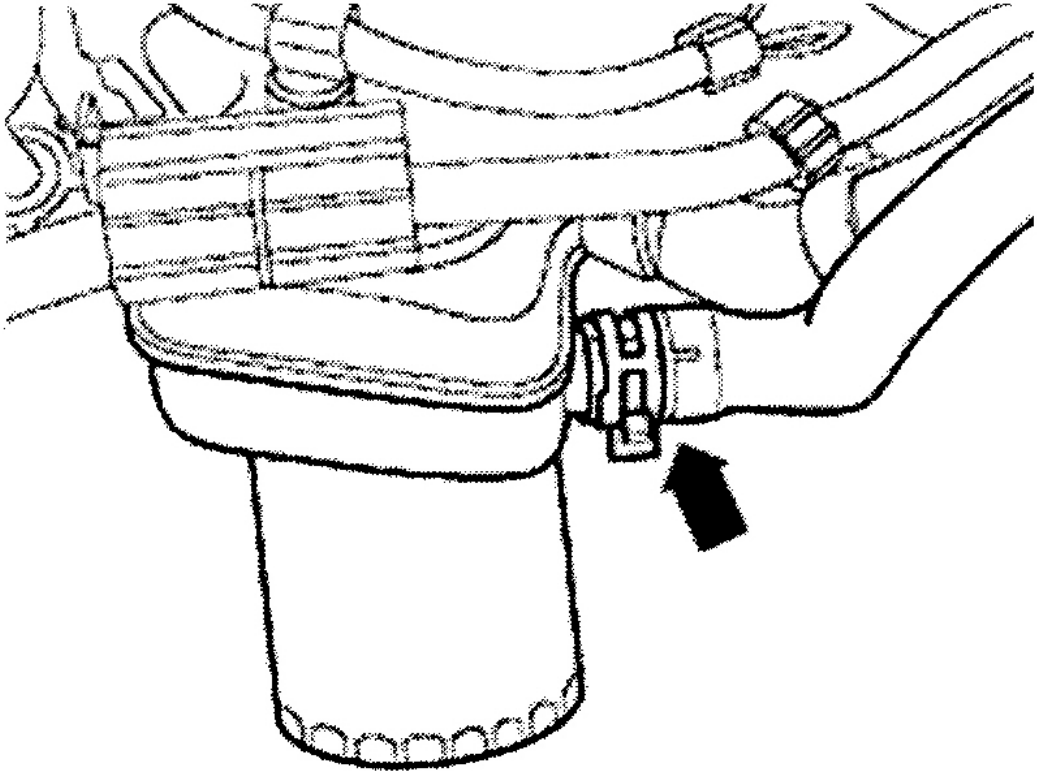


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Fig. 7: Removing Oil Cooler Coolant Hose
Courtesy of AUDI OF AMERICA, INC.

3. Turn radiator drain screw closed, and tighten. Push coolant hose onto oil cooler, and tighten hose clamp.

CAUTION: DO NOT mix Green and Red coolant. Mixing these two coolant types will cause severe engine damage. Use ONLY G 012 A8 D Red coolant. See COOLING SYSTEM SPECIFICATIONS .

CAUTION: On model year 2004 Golf and Jetta, engine code BEV, uses G12 coolant that is Lilac (Purple) in color. Refer to TSB Group 19 No. 02-01, dated Dec. 20, 2002. See COOLANT (ANTIFREEZE), MIXING PRECAUTIONS .

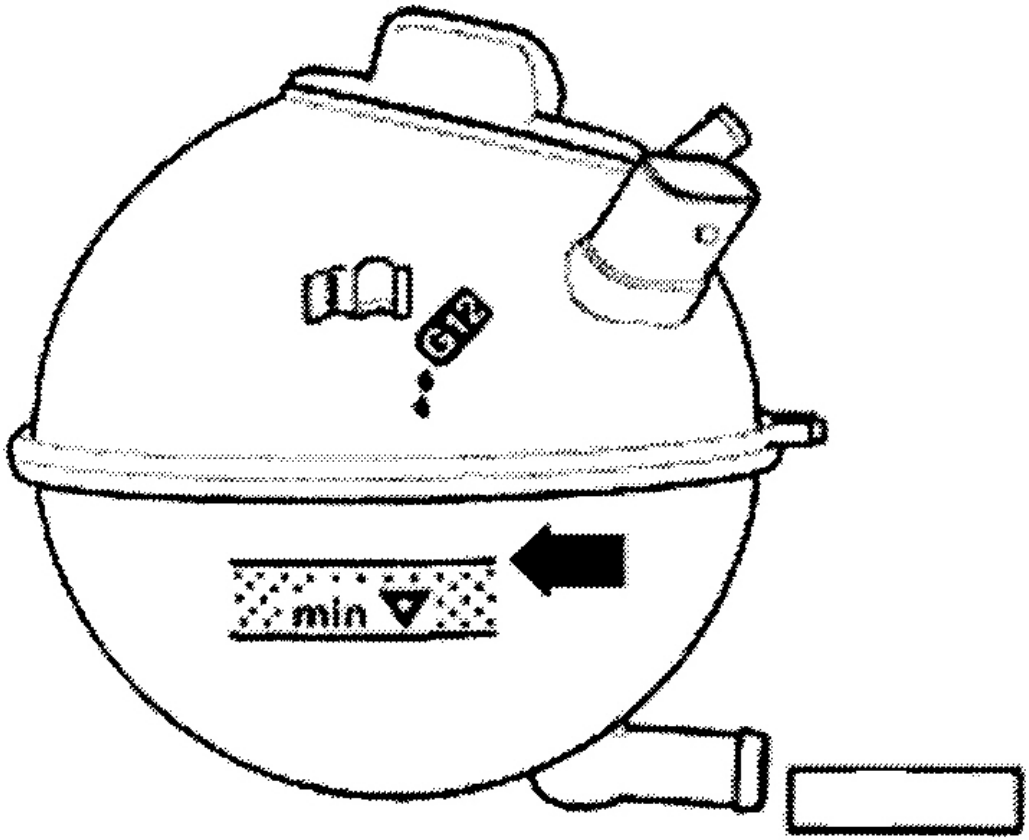

Fig. 8: Identifying Expansion Tank Markings
Courtesy of VOLKSWAGEN UNITED STATES, INC.

4. If VAS 6096 Charging Unit is available, close drain plug at radiator. Connect oil cooler hoses. Fill cooling system according to VAS 6096 Charging Unit instruction manual. Fill cooling system with recommended coolant mixture. See **COOLING SYSTEM SPECIFICATIONS** . If VAS 6096 Charging Unit is not available, close drain plug at radiator. Connect oil cooler hoses. Fill cooling system with recommended coolant mixture. See **COOLING SYSTEM SPECIFICATIONS** . Slowly fill expansion tank with coolant to upper hatch mark. See **Fig. 8** . Install expansion tank cap.
5. Turn off A/C and heat controls. Start engine, and raise engine speed to 2000 RPM for approximately 3 minutes. Allow engine to idle, until coolant fan turns on. Check coolant level, and top off as necessary. Turn ignition off.
6. When engine is at normal operating temperature, coolant level must be at upper marking of shaded area, on expansion tank. When engine is cold, coolant level should be at approximately middle of shaded area. See **Fig. 8** .

WARNING: Cooling system is pressurized, when engine is at operating temperature. Use caution and use other appropriate protective gear (safety glasses and gloves) when servicing cooling system. Slowly and carefully release system pressure, before performing any repairs.

1. Turn engine off, and allow to cool. Open cap on coolant expansion tank. Raise and support vehicle. Remove noise insulation panel from below engine compartment. See **Fig. 9** or **Fig. 10** . Place appropriate drain pan underneath vehicle.

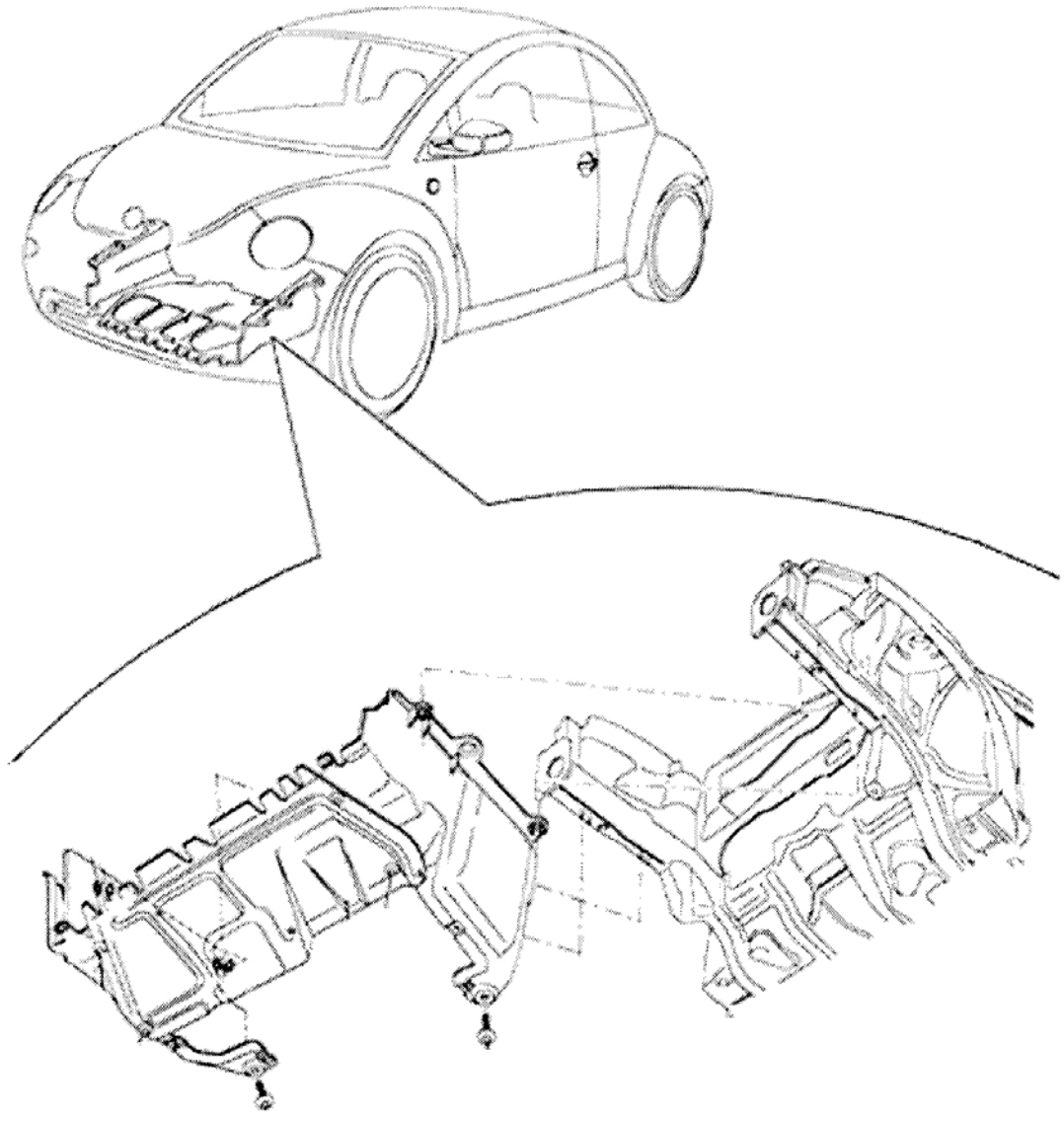

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Fig. 9: Identifying Noise Insulation Mounting Points (New Beetle)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

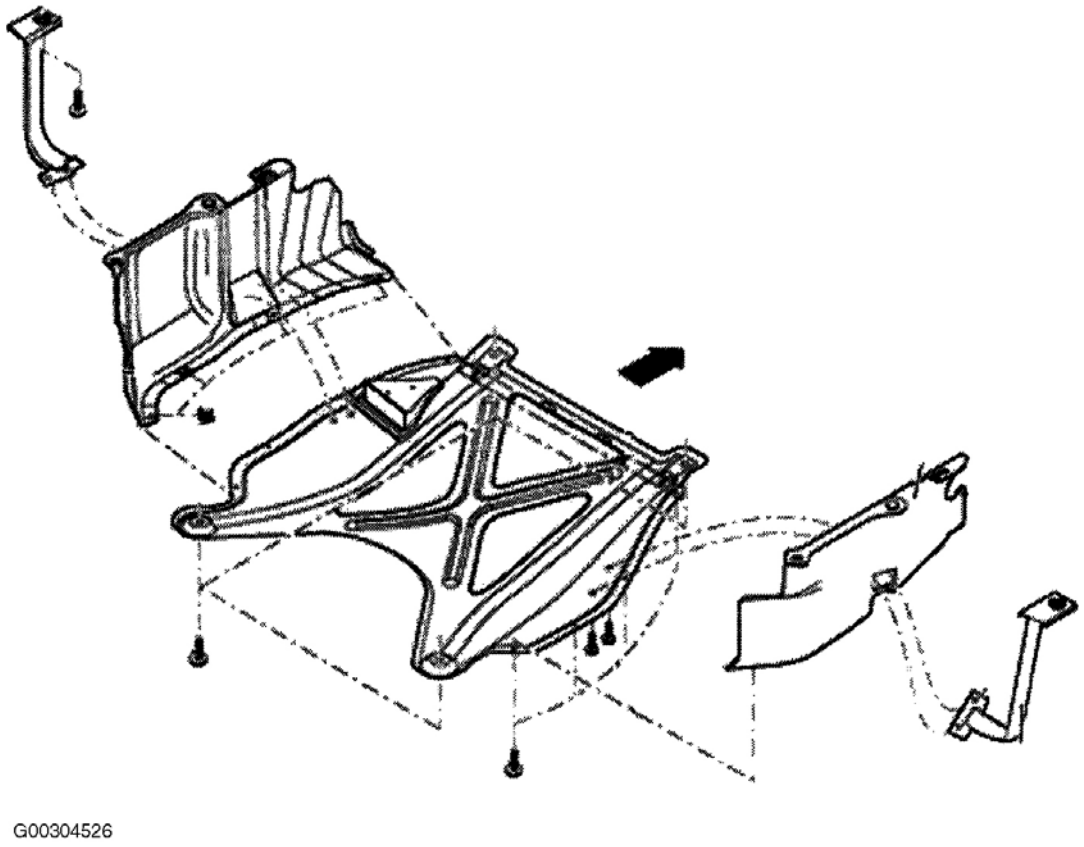

Fig. 10: Identifying Noise Insulation Mounting Points (New Beetle Convertible)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

2. Unscrew drain plug (arrow), and drain coolant from radiator. See **Fig. 6** .
3. Remove coolant hose from oil cooler, and drain coolant from engine. See **Fig. 7** .

CAUTION: DO NOT mix Green with Lilac coolant. Mixing these coolant types will cause severe engine damage. Use ONLY G 012 A8 F Lilac coolant. See COOLING SYSTEM SPECIFICATIONS .

NOTE: If filling cooling system, using VAG 6096 Charging Unit, go to step 9 .

4. On vehicles with expansion tank MAX/MIN markings, close drain plug at radiator. Connect oil cooler hoses. Fill cooling system with recommended coolant mixture. See **COOLING SYSTEM SPECIFICATIONS** . Install expansion tank cap. Turn off A/C and heater controls. Start engine, and raise engine speed to 2000 RPM for approximately 3 minutes. Allow engine to idle, until coolant fan

turns on. Turn ignition off.

5. Check coolant level, and top off as necessary. When engine is at normal operating temperature, coolant level must be on MAX mark, on expansion tank. See **Fig. 11** . When engine is cold, coolant level must be between MIN and MAX marks, on expansion tank.

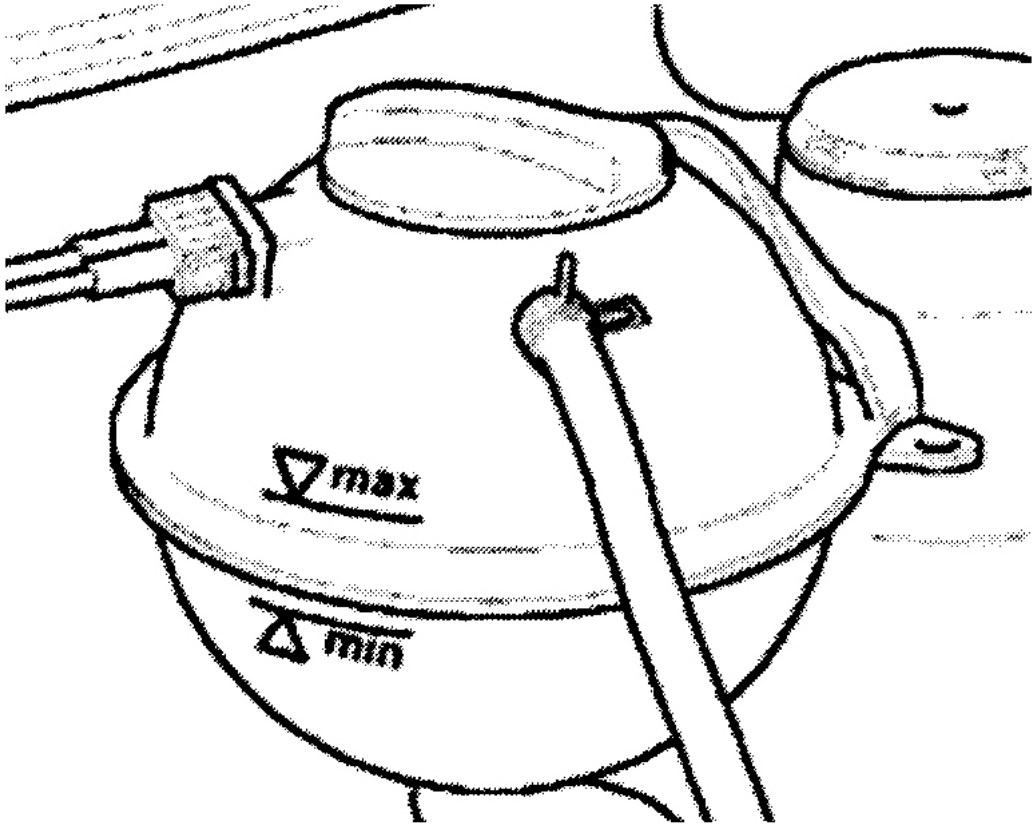

Fig. 11: Identifying Expansion Tank Markings
Courtesy of VOLKSWAGEN UNITED STATES, INC.

6. On vehicles without expansion tank markings, close drain plug at radiator. Connect oil cooler hoses. Fill cooling system with recommended coolant mixture. See **COOLING SYSTEM SPECIFICATIONS** . Slowly fill expansion tank with coolant to upper hatch mark (arrow). See **Fig. 12** . Install expansion tank cap.

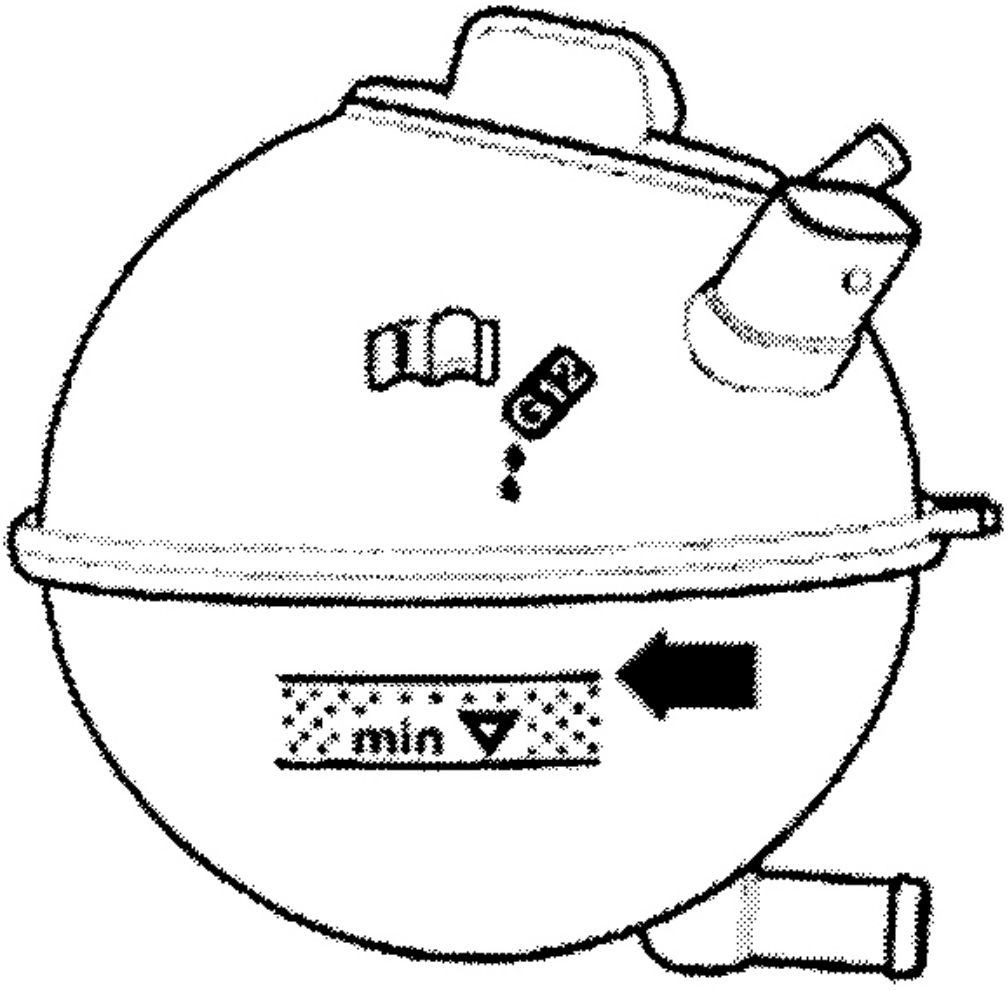

Fig. 12: Identifying Expansion Tank Hatch Marks
Courtesy of VOLKSWAGEN UNITED STATES, INC.

7. Turn off A/C and heater controls. Start engine, and raise engine speed to 2000 RPM for approximately 3 minutes. Allow engine to idle, until coolant fan turns on. Turn ignition off.
8. Check coolant level, and top off as necessary. When engine is at normal operating temperature, coolant level must be at upper hatch mark, on expansion tank. See **Fig. 12** . When engine is cold, coolant level should be around middle of hatch mark, on expansion tank.
9. If VAS 6096 Charging Unit is available, close drain plug at radiator. Connect oil cooler hoses. Fill cooling system according to VAS 6096 Charging Unit instruction manual. Fill cooling system with

recommended coolant mixture. See **COOLING SYSTEM SPECIFICATIONS** .

SERVICING

WARNING: Cooling system is pressurized, when engine is at operating temperature. Wear gloves, and other appropriate protection. Slowly and carefully release system pressure, before performing any repairs.

Coolant does not usually need replacing. In case of larger repairs when coolant needs to be drained, new coolant must be used because, old has been exposed to oxidation and dirt. Flush cooling system when replacing coolant. To flush, fill system with clear water, and run engine for approximately 2 minutes. Drain cooling system. See **DRAINING, FILLING & BLEEDING** . Flushing system should remove most coolant residue.

Coolant to water ratio must not exceed 60%. Frost protection and cooling efficiency will decrease if the percentage of coolant is too high. For coolant to water ratio, see **COOLANT MIXTURE RECOMMENDATIONS** table under COOLING SYSTEM SPECIFICATIONS.

ADJUSTMENTS

If belt is to be reused, mark direction of rotation prior to removing drive belt. Serpentine belt is self-adjusting. For proper belt routing, see **DRIVE BELT ROUTING** .

DRIVE BELT ROUTING

NOTE: Serpentine belt is self-adjusting. See Fig. 13 or Fig. 14 .

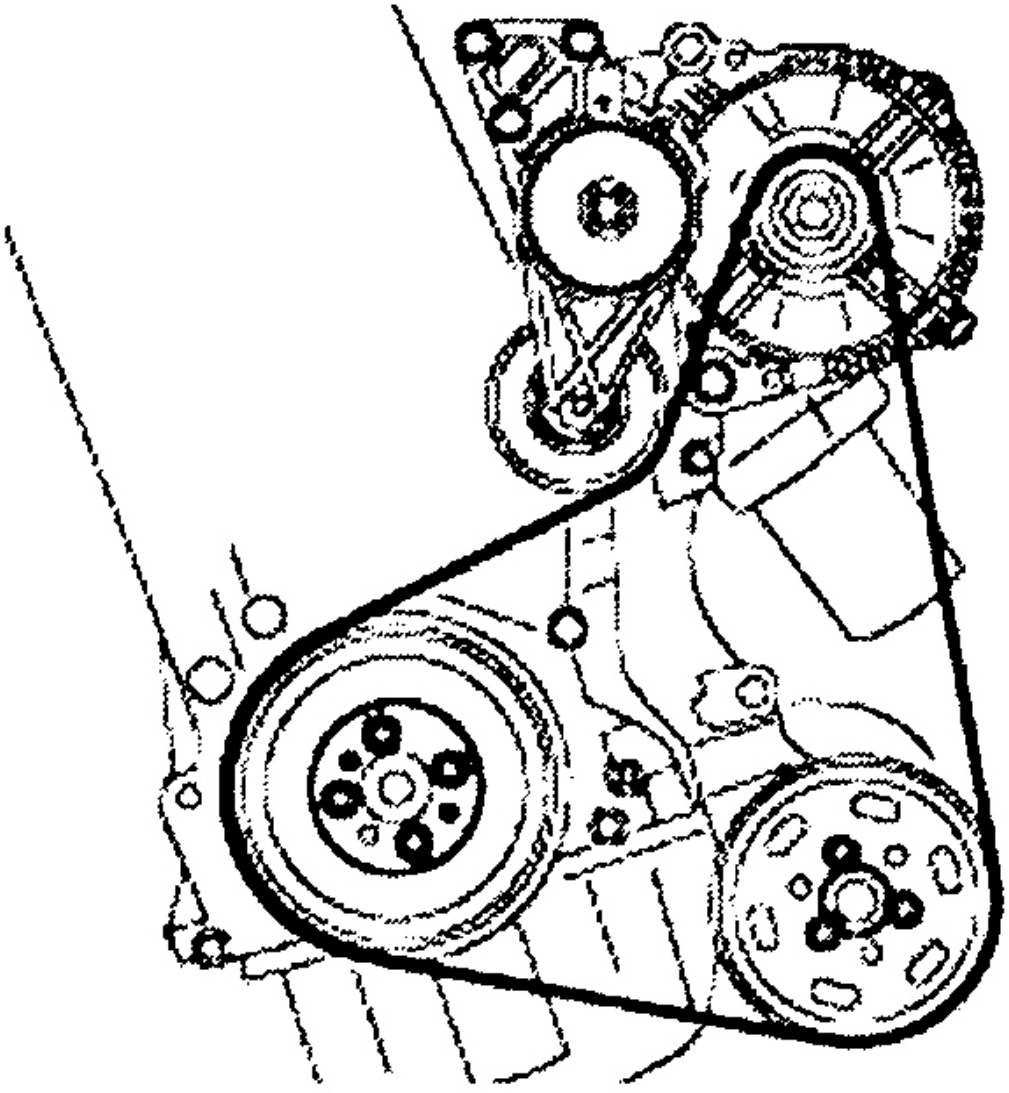

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Fig. 13: Drive Belt Routing (Without A/C)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

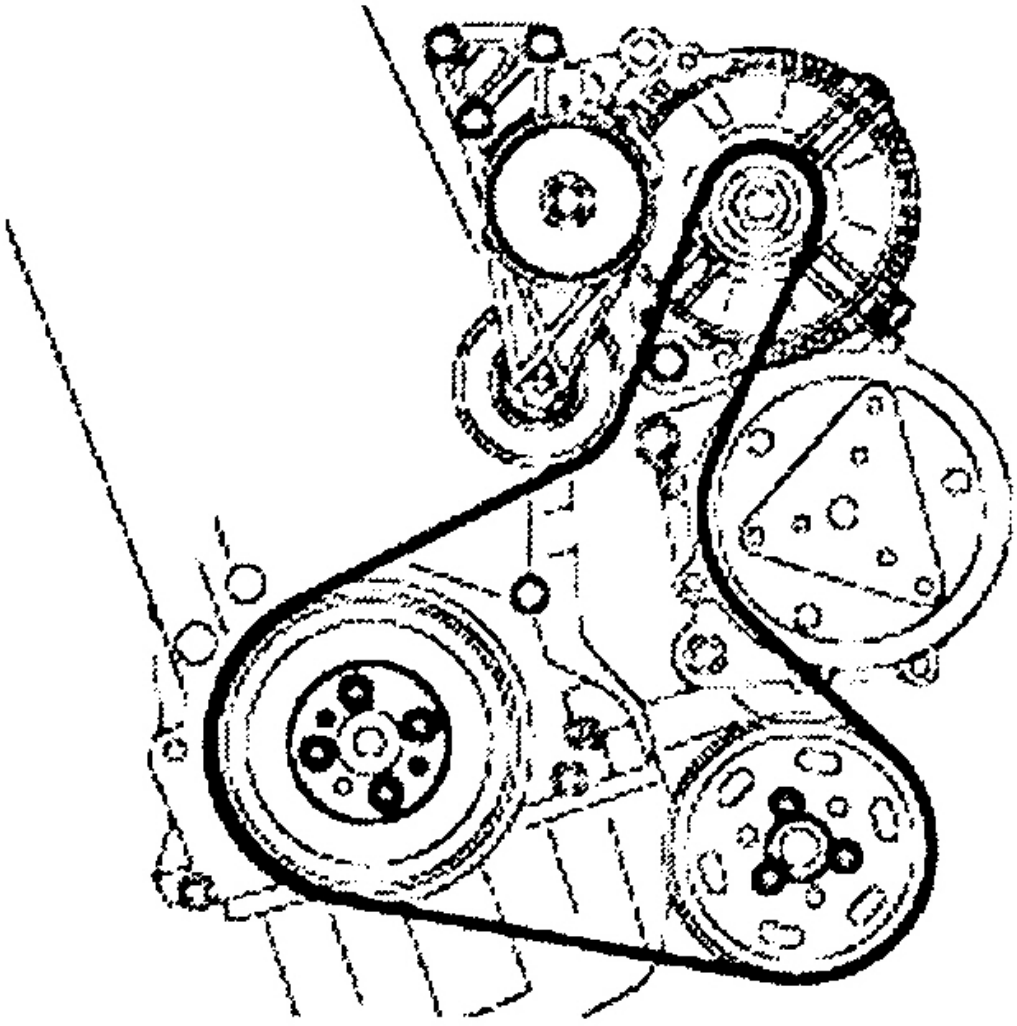

Fig. 14: Drive Belt Routing (With A/C)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

DRIVE BELT, REMOVING & INSTALLING

Remove engine cover. Rotate serpentine belt tensioner clockwise to relieve belt tension. Remove serpentine belt. See **Fig. 15** . Lock in place using Mandrel (T10060) or a drift.

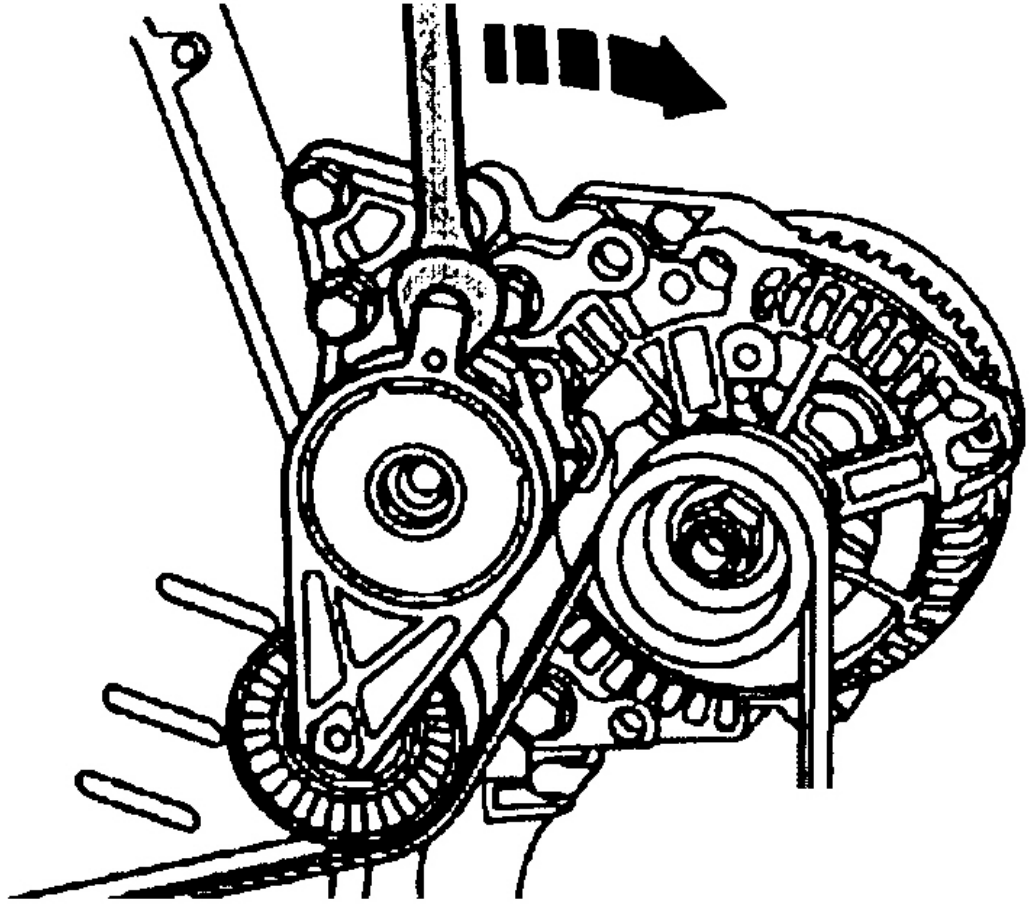

Fig. 15: Releasing Serpentine Belt Tensioner
Courtesy of VOLKSWAGEN UNITED STATES, INC.

COOLING SYSTEM SPECIFICATIONS

COOLANT MIXTURE RECOMMENDATIONS

Application	Specification
Freeze Point	
Down To -13° F (- 25° C)	40% Coolant
Down To -31° F (- 35° C)	50% Coolant

COOLING SYSTEM SPECIFICATIONS

Application	Specification

Coolant Capacity	(1) 5.3 Qts. (5.0L)
Coolant Replacement Interval	(2)
Recommended Coolant	
Golf & Jetta (3) , (5)	(4) Red G 012 A8 D
New Beetle	(5) Lilac (Purple) G 012 A8 F
Cooling Fan Thermal Switch	
First Stage	
On	198-207° F (92-97° C)
Off	183-196°F (84-91°C)
Second Stage	
On	210-221°F (99-105°C)
Off	196-208°F (91-98°C)
Thermostat	
Starts To Open	186°F (87°C)
Fully Open	216°F (102°C)
Opening Stroke	.28" (7 mm)

(1) Total coolant quantity may vary depending on vehicle equipment.

(2) Manufacturer does not require routine coolant replacement. Replace coolant only if major repair is necessary.

(3) On model year 2004 Golf and Jetta, engine code BEV, uses G12 coolant that is Lilac (Purple) in color. Refer to TSB Group 19 No. 02-01, dated Dec. 20, 2002. See **COOLANT (ANTIFREEZE), MIXING PRECAUTIONS** .

(4) G12 coolant is Red in color. DO NOT mix Green and Red coolant. Mixing these coolant types will cause severe engine damage.

(5) G12 coolant is Lilac (Purple) in color. DO NOT mix Green with Lilac coolant. Mixing these coolant types will cause severe engine damage.